REMARKS

Claims 1-16 are pending; claims 5, 6, and 8 have been cancelled; claims 1-4, 9-14 have been withdrawn. Claim 7 has been amended and claims 15 and 16 are newly presented. Favorable reconsideration, reexamination, and allowance of the present patent application are respectfully requested in view of the foregoing amendments and the following remarks.

Claim of Priority under 35 U.S.C. §119

Applicants thank the Examiner for acknowledgement of the claim for priority under 35 U.S.C. §119 and receipt of the priority document.

The Rejection of Claims 5-8 under 35 U.S.C. §101.

Claims 5-8 were rejected under 35 U.S.C. §101 for allegedly encompassing naturally-occurring compounds. Applicants have amended the pending claims to incorporate the term 'isolated' as suggested by the Examiner. Therefore, applicants respectfully request that the rejection be withdrawn.

The Rejection of Claims 5-8 under 35 U.S.C. §112, 2nd Paragraph

Claims 5-8 were rejected under 35 U.S.C. §112, 2nd paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter of the invention. In particular, the Examiner has rejected the claims as allegedly being indefinite for failing to recite the specific hybridization conditions. Claim 5 has been amended to recite these conditions. Therefore, withdrawal of this rejection is respectfully requested.

The Examiner also alleges the claims are ambiguous in the recitation of (C) and

(D) without (A) and (B). The amended claims address this concern, and therefore, withdrawal of the rejection on this basis is respectfully requested.

The Rejection of Claims 5-8 under 35 U.S.C. §101 and §112, 1st Paragraph

Claims 5-8 were rejected under 35 U.S.C. §101, as allegedly not being supported by a specific and substantial asserted utility or a well-established utility. Prior to addressing the merits of this rejection, applicants assert that the Examiner has not met his initial burden of challenging applicant's presumptively correct assertion of utility. See *In re Swartz* 232 F.3d 862 (Fed. Cir. 2000). The burden of rebuttal only shifts to applicants once the Examiner provides evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility. *Id.* See also *In re Brana* 51 F.3d 1560 (Fed. Cir. 1995). The Examiner has stated that applicants have failed to provide a "specific utility", a "substantial utility" or a "well established" utility. The Examiner also asserts there is no "real world" use for the claimed invention.

The Examiner has asserted that the asserted utility is for "treating an unspecified, undisclosed disease or condition" (see office action, page 6). This is entirely false as applicants do not state anywhere or suggest, either explicitly or inherently, that this is the asserted utility. The asserted utility of the claimed gene and protein of the present invention is that they are useful for breeding of a microorganism for the purpose of modifying transport of amino acids across a cell membrane (see page 1, lines 9-12, page 3, lines 3-7, page 8, table 1, and page 21, lines 15-19). This has nothing to do with treating a disease or condition. If the Examiner has not understood the asserted utility, he certainly cannot meet his initial burden of providing evidence to establish reasonable

doubt, and thereby shifting the burden to applicants. For this reason alone, the rejection should be withdrawn. In the interest of advancing prosecution, however, applicants present the following arguments in response to this rejection.

The Examiner has injected requirements and standards into 35 U.S.C. §101 that simply do not exist. Patent applicants are required to assert a utility in the specification for the claimed invention under §101, and that utility must be shown to be "operable to achieve useful results". See *Swartz.* There is no requirement in the statute or as interpreted by the Courts that the utility be "specific", "substantial", or "well-established". In fact, inoperable embodiments are permitted. *Atlas Powder co. v. E.I. du Pont De Nemours & Co.,* 750 F.2d 1569, 1576 (Fed. Cir. 1984). The Court has also read this requirement as meaning the utility must be 'practical' *In re Zeigler* 992 F.2d 1197 (Fed. Cir. 1993). The seminal case, *Brenner v. Manson* 383 U.S. 519 (1966), did state that to satisfy §101, the disclosure must assert a "specific benefit... in currently available form" and was cited by the Federal Circuit in reference to an asserted utility of a chemical compound as "a potential role as an object of use testing". See *Zeigler.* However, there is no requirement for a "substantial" utility, nor a "well-established" utility.

The asserted utility of the claimed gene and protein of the present invention is that they are useful for breeding of a microorganism for the purpose of modifying transport of amino acids across a cell membrane (see page 1, lines 9-12, page 3, lines 3-7, page 8, table 1, and page 21, lines 15-19). This is applicant's asserted utility for the claimed invention. To assert the objective truth of this statement, applicant has provided evidence that the claimed gene and protein are members of a family of genes/proteins which are

known in the art to be useful as ATP-binding cassette transporters (ABC transporters). The ATP transporters have an established physiological function of uptake and excretion of substances into and out of the cell, hence the term 'transporters'. This is obviously an important and defined function in the cell machinery, allowing a cell to excrete toxic and unneeded substances, while importing useful substances for its metabolism, for example. Applicants assert that the Examiner has failed to establish reasonable doubt of the objective truth of any of the above statements.

The gene/protein of the present invention has several asserted utilities: the transport of amino acids across the membrane of the cell, for secreting amino acids out of the cell, and for importing amino acids into the cell. Transporters have a defined and credible usefullness which is practical in that these proteins can be expressed in a cell and effect the transport of substances, and in the instant invention, amino acids, inside and outside of the cell. Any person of ordinary skill in the art would recognize this utility as useful and 'in currently available form' and not merely an object of further 'use-testing'. The protein of the instant invention is clearly an ABC transporter, and this utility has been established by the inventors. No further use-testing needs to be conducted to establish utilility. Although further research might be conducted to further evaluate the protein, the current evidence as presented is sufficient to satisfy §101, since it shows the claimed gene/protein's usefulness as a transporter in the cell machinery.

To further establish the claimed gene/protein as a member of the ABC transporter family, applicants provide a FASTA search of the protein of SEQ ID NO: 9. In this search, the only matches which were found to have significant homology were ABC transporters. This homology clearly establishes the claimed protein as a member of this

family.

As further evidence to rebut the Examiner's assertions, applicants provide a reference (*Arch Microbiol* 180:88-100 (2003)) which demonstrates the known usefulness of ABC transporters as amino acid transporters, involved in the uptake and excretion. Further references, EP1038970 and AU 199719218 show that production of an amino acid can be effected by disrupting a gene which encodes an amino acid uptake protein, or that amplifying a gene involved in amino acid export can enhance the production of an amino acid. Therefore, further usefulness of the ABC transporter gene/protein is established.

The Examiner has also asserted that applicants have failed to disclose ligands or compounds which can be transported, and therefore, the asserted utility for the ABC transporters are "essentially methods of treating unspecified, undisclosed diseases or conditions, which does not define a 'real world' context of use." Office action, page 6. First, applicants clearly state that the asserted utility of the novel ABC transporter gene/protein is for transporting amino acids in/out of the cell. Second, why must the asserted utility have a therapeutic use of the 'real world'? The applicants do not assert that the claimed invention is useful for treatment of diseases or conditions. In fact, as anyone of ordinary skill in the art would know, amino acid production using bacteria is a large billion dollar business in the United States and around the world. Bacterial breeding methods for increasing amino acid production are the research focus of many international corporations, including the assignee of the present application. Establishing new bacteria which can efficiently produce amino acids is also an area of intense research interest for many of these same companies. Amino acids have many 'real world'

applications, only a few of which are to treat 'diseases or conditions'. In fact, one of the most common uses for amino acid is for feed supplements for livestock. The Examiner cannot require proof of pharmaceutical utility, particular where none has been asserted. Again, the Examiner has failed to establish reasonable doubt of applicant's asserted utility, which has nothing to do with treatment of any disease or condition.

On page 9 of the office action, the Examiner again tries to require evidence of pharmaceutical usefulness in stating that "There is no evidence or record or any line of reasoning that would support a conclusion that the claimed protein/polynucleotide was, as of the filing date, useful for diagnosis, prevention and treatment of an [*sic*] disease, or for screening compounds." On page 11, the Examiner asserts "The assertion that the claimed invention has utility in drug screening, testing, drug development and disease diagnosis, do not meet the standards for a specific substantial or well-established utility....". There is no instance in the specification where applicants assert the claimed invention has utility in drug screening, testing, drug development, or disease diagnosis. Applicants cannot be required to provide evidence for a utility which has not been asserted or is counter to the utility that has been asserted. The gene/protein of the present invention is useful, in one instance, as a transporter for amino acids to the outside of the cell membrane. The Examiner has failed to establish reasonable doubt that the claimed gene/protein is not useful as asserted by applicants. The gene/protein is clearly a member of the ABC transporter family of proteins. This family of proteins is clearly involved in the uptake and secretion of amino acids in bacterial cells. Finally, it is clear that production of an amino acid can be enhanced by disrupting a gene involved in uptake of amino acids or amplification of a gene involved in secretion of an amino acid. These utilities are

involved in amino acid production, not diagnosing, preventing, and/or treating a disease, as the Examiner is asserting.

The Examiner asserts on page 11 that applicants have failed to show whether an increase in expression of the claimed gene/protein would be toxic. Toxicity testing is not required to show utility, particularly when the asserted utility is not pharmaceutical in nature. Such a requirement is entirely unfounded.

For this reason, applicants assert that the Examiner has failed to establish reasonable doubt as to the operability of the claimed invention, particularly since the Examiner does not appear to understand or comprehend the asserted utility. Therefore, the burden cannot shift to applicants. In the interest of advancing prosecution, however, applicants have provided evidence and arguments to rebut the Examiner's asserted lack of utility. For these reasons, applicants respectfully request the rejection be withdrawn.

The Rejection of Claims 5-8 under 35 U.S.C. §112, 1st Paragraph

Claims 5-8 are rejected under 35 U.S.C. §112, 1st paragraph for allegedly not being able to know how to use the claimed invention. Again, the Examiner asserts that the person of skill in the art would not know how to use the invention since no specific function as been disclosed for the claimed polynucleotide. As stated above, the claimed gene/protein has been identified as a member of the ABC transporter family, members of which are useful as transporters of amino acids outside of the cell (see evidence and arguments presented above). This is a 'real world' utility since amino acid production is a multi-billion dollar business.

Applicants have limited their claims so that only the DNA sequence of SEQ ID

No. 7 and variants thereof which hybidize to SEQ ID No. 9 under the now-claimed washing conditions are encompassed. The language allowing for protein variants has been cancelled. In light of the amendments and the arguments and evidence presented above, applicant's respectfully request that the rejection be withdrawn.

The Rejection of Claims 5-8 under 35 U.S.C. §112, 1st Paragraph, written description

Claims 5-8 are rejected under 35 U.S.C. §112, 1st paragraph as allegedly containing subject matter which was not described in the specfication in such as way as to reasonably convey to one skilled in the relevant art that the inventors had possession of the claimed invention. The claims as amended are directed to a DNA sequence which can be the sequence shown in SEQ ID NO. 7, a DNA sequence which can hybridize to SEQ ID NO. 7 under stringent conditions (as defined in the claim), or a protein encoded by said DNA. The Examiner has stated that a common function of the nucleic acid based upon a common property or critical technical feature of the genus is not disclosed. First, the genus is not much smaller than prior to the amendment. The hybridization under stringent conditions clearly limits the variants of the sequence shown in SEQ ID NO. 9, and contrary to the Examiner's assertion (see page 20 of the Office action), the stringent conditions of the hybridization will NOT produce polynucleotides that encode polypeptides which are completely unrelated to the polypeptide of SEQ ID NO. 9. Second, there is clearly a common technical feature of the claimed invention, in that the novel gene/protein of the invention is useful as an ABC transporter. These proteins are known in the art for being able to transport amino acids into or out of a cell, as demonstrated by the evidence presented (see *Arch Microbiol* article). Therefore, one of

ordinary skill in the art would be able to determine other hybridization variants by their common activity and critical special feature as an ABC transporter. It is clear, therefore, that a person of ordinary skill in the art would recognize what the inventors have claimed.

For the reasons presented above, and in conjunction with the evidence presented herein, applicants respectfully request that the rejection be withdrawn.

Conclusion

For at least the foregoing reasons, Applicant respectfully submits that the present patent application is in condition for allowance. An early indication of the allowability of the present patent application is therefore respectfully solicited.

If Examiner Basi believes that a telephone conference with the undersigned would expedite passage of the present patent application to issue, he is invited to call on the number below.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and the undersigned respectfully requests that she be contacted immediately.

Respectfully submitted,

By: _____

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